

# PATENT ABSTRACTS OF JAPAN

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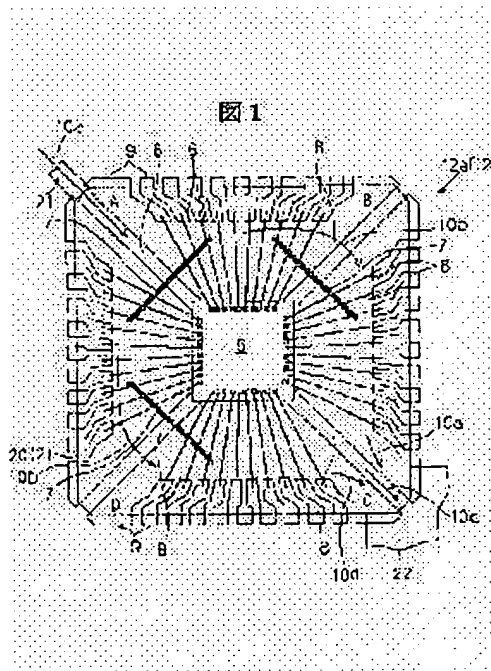
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## (54) METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE

### (57)Abstract:

PROBLEM TO BE SOLVED: To restrain flow of wire caused by injected resin in transfer molding.

SOLUTION: The method of manufacturing a semiconductor device is provided with a process which prepares a lead frame comprising a plurality of leads whose tips face a tab used to fix a semiconductor element and the circumference of the tab, a process in which the semiconductor element is fixed onto the tab, a process in which a plurality of electrodes formed on the surface of the semiconductor element and the plurality of leads are electrically connected respectively by conductive wires, a process in which a part of the lead frame is covered with an insulating resin by transfer molding and which forms a sealing body used to cover at least the semiconductor element, the wires and lead inner end parts and a process in which tab suspension leads connected to the leads protruding to the outside from the sealing body and to the tab are cut in prescribed places and in which the unnecessary part of the lead frame is cut and removed. After the connection process of the wires, the adjacent wires are connected and fixed by a fixing body so as to circle the edge of a semiconductor chip, and transfer molding is performed after that.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] The process which prepares the leadframe which has two or more leads to which a tip is made to face the perimeter of the tab which fixes a semiconductor device, and said tab, The process which fixes said semiconductor device on said tab, and the process which connects said lead with two or more electrodes prepared in the front face of said semiconductor device electrically with a conductive wire, respectively, The process which covers said a part of leadframe by insulating resin, and forms a wrap closure object for a part for said semiconductor device, said wire, and said lead toe at least by transfermold, It is the manufacture approach of a semiconductor device of having the process which carries out cutting removal of the unnecessary leadframe part while cutting the tab \*\*\*\* lead which stands in a row in the lead which projects outside, and said tab from said closure object in a predetermined part. The wires located near the gate where said resin of the mold metal mold in said transfermold is poured in are fixed with an insulating fixed object after the connection process of said wire. Or the wires located in the part which changes the flow direction of said resin within the wires located near the gate where said resin of the mold metal mold in said transfermold is poured in, and mold metal mold are fixed with an insulating fixed object. The manufacture approach of the semiconductor device characterized by performing transfermold after that.

[Claim 2] The manufacture approach of the semiconductor device according to claim 1 characterized by fixing the wire located in the part which changes the flow direction of said resin to the tab \*\*\*\* lead which stands in a row in said tab or said tab.

[Claim 3] The manufacture approach of the semiconductor device according to claim 1 or 2 characterized by fixing from the fixed portion of said semiconductor device of said wire with said fixed object to a location in the middle of said wire.

[Claim 4] The manufacture approach of a semiconductor device given in any 1 term of claim 1 characterized by moving a nozzle, connecting said each wire, extruding insulating paste-like resin from a nozzle tip, stiffening the account insulation resin of back to front, and forming said fixed object thru/or claim 3.

[Claim 5] The process which prepares the leadframe which has two or more leads to which a tip is made to face the perimeter of the tab which fixes a semiconductor device, and said tab, The process which fixes said semiconductor device on said tab, and the process which connects said lead with two or more electrodes prepared in the front face of said semiconductor device electrically with a conductive wire, respectively, The process which covers said a part of leadframe by insulating resin, and forms a wrap closure object for a part for said semiconductor device, said wire, and said lead toe at least by transfermold, It is the manufacture approach of a semiconductor device of having the process which carries out cutting removal of the unnecessary leadframe part while cutting the tab \*\*\*\* lead which stands in a row in the lead which projects outside, and said tab from said closure object in a predetermined part. The manufacture approach of the semiconductor device which carries out connection immobilization of the wires which adjoin so that it may go around the edge of said semiconductor chip with a fixed object after the connection process of said wire, and is characterized by performing transfermold after that.

[Claim 6] The process which prepares the leadframe which has two or more leads to which a tip is made to face the perimeter of the tab which fixes a semiconductor device, and said tab, The process which fixes said semiconductor device on said tab, and the process which connects said lead with two or more electrodes

prepared in the front face of said semiconductor device electrically with a conductive wire, respectively, The process which covers said a part of leadframe by insulating resin, and forms a wrap closure object for a part for said semiconductor device, said wire, and said lead toe at least by transfermold, It is the manufacture approach of a semiconductor device of having the process which carries out cutting removal of the unnecessary leadframe part while cutting the tab \*\*\*\* lead which stands in a row in the lead which projects outside, and said tab from said closure object in a predetermined part. The manufacture approach of the semiconductor device characterized by making it paste up while piling up an adhesive fixed object with a larger appearance than said semiconductor device on the wire on said semiconductor device, fixing said all wires after the connection process of said wire, and performing transfermold after that.

[Claim 7] The manufacture approach of the semiconductor device according to claim 6 characterized by using the fixed object of one configuration of the shape of tabular, the shape of a stitch, and a frame as said fixed object.


[Claim 8] Said fixed object is the manufacture approach of the semiconductor device according to claim 6 characterized by having the part fused with heat, and the part fused by UV irradiation at least in a part, and making connection with said wire by heating or UV irradiation.

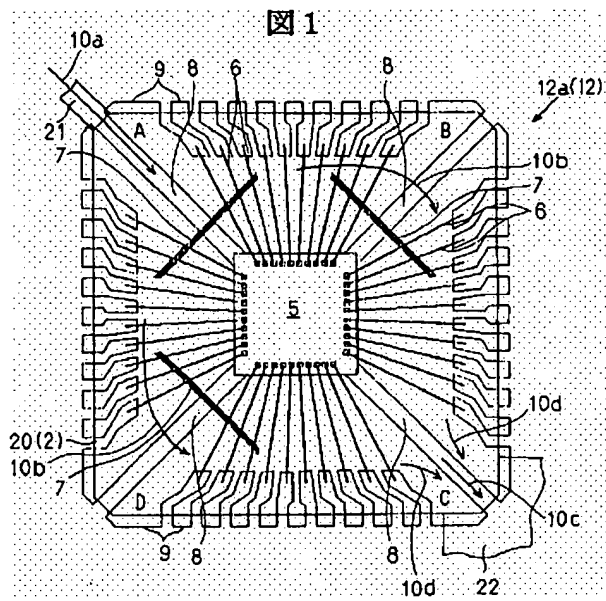
[Claim 9] Said fixed object is the manufacture approach of the semiconductor device according to claim 6 characterized by putting said fixed object on said wire so that all the edges of said fixed object may project outside the edge of said semiconductor device more greatly than said semiconductor device.

[Claim 10] The process which prepares the leadframe which has two or more leads to which a tip is made to face the perimeter of the tab which fixes a semiconductor device, and said tab, The process which fixes said semiconductor device on said tab, and the process which connects said lead with two or more electrodes prepared in the front face of said semiconductor device electrically with a conductive wire, respectively, The process which covers said a part of leadframe by insulating resin, and forms a wrap closure object for a part for said semiconductor device, said wire, and said lead toe at least by transfermold, It is the manufacture approach of a semiconductor device of having the process which carries out cutting removal of the unnecessary leadframe part while cutting the tab \*\*\*\* lead which stands in a row in the lead which projects outside, and said tab from said closure object in a predetermined part. While making it spread to extent which supplies insulating paste-like resin on said semiconductor device after the connection process of said wire, sprays a gas on said resin after that, and is protruded in predetermined length from the periphery of said semiconductor device The manufacture approach of the semiconductor device characterized by covering even the middle of the part which extends on the outside of said semiconductor device from the fixed portion of said semiconductor device of said wire, stiffening said resin subsequently, forming a fixed object, and fixing all wires with this fixed object.

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[Translation done.]

Drawing selection Representative drawing 



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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] In case this invention forms a closure object by transfermold especially with respect to the manufacture approach of semiconductor devices, such as LSI (large-scale integrated circuit) of a plastic molded type, of having used the leadframe, the wires which adjoin with the resin to pour in contact, or it is applied to the technique which can inhibit the defect whom a tab \*\*\*\* lead and a wire contact, and relates to an effective technique.

[0002]

[Description of the Prior Art] As for a plastic molded type semiconductor device, a leadframe is used in the manufacture. A leadframe is manufactured by forming a metal plate in a request pattern by punching and etching by the precision press. A leadframe has two or more leads to which a tip (inner edge) is made to face the tab for fixing a semiconductor device (semiconductor chip), and the perimeter of said supporter.

Moreover, said tab is supported by the tab \*\*\*\* lead which extends from the frame part of a leadframe.

[0003] When manufacturing a plastic molded type semiconductor device using such a leadframe, while fixing a semiconductor chip on the tab of said leadframe The tip of said lead is connected with the electrode of said semiconductor chip with a conductive wire. One end within a lead which contains a wire and a semiconductor chip after that is closed by insulating resin (resin), an opening is filled, a closure object (resin-seal object: package) is formed, and while carrying out cutting removal of the leadframe part unnecessary subsequently, the lead and tab \*\*\*\* lead which project from a package are cut.

[0004] In manufacture of such a plastic molded type semiconductor device, when manufacturing a resin seal object using transfermold equipment, adjoining wires may contact, or a thin wire may be poured with the resin poured in from the gate of mold metal mold, and it may approach, and may become the cause of short [ poor ].

[0005] For example, in order to prevent contact by the wire deformation at the time of mold, the technique which connected wires on the bridge by insulating resin is indicated by JP,5-121474,A. However, with this technique, the wires which the corner part of a semiconductor chip adjoins are not connected on a bridge.

[0006] Moreover, the technique which carried out the closure (coating) of a die pad (or substrate), the chip on it, and the wire of the circumference of it by insulating resin (it differs from mold resin) is indicated by JP,5-121474,A, JP,8-107163,A, and the 2000 No. -31195 official report for the wire short prevention at the time of mold.

[0007] Moreover, the technique which has arranged the insulating means between wires for the short prevention between wires is indicated by JP,5-136319,A and JP,10-294327,A. Moreover, the technique which established the wire contact prevention means on the tab is indicated by JP,5-90474,A and JP,5-335365,A.

[0008]

[Problem(s) to be Solved by the Invention] The miniaturization of a semiconductor device (semiconductor chip) is progressing with the miniaturization of a semiconductor device. Although it is in the inclination for an inner lead to become long, with increase of the number of leads (the number of terminals), and the formation of a small chip, it is difficult to lengthen the processing top inner lead of a leadframe. Moreover, if an inner

lead is shortened, the distance (spacing) of the electrode and the wire connecting location for a point of an inner lead which were prepared on the surface of the semiconductor chip will become long, and the die length of the wire which connects said both will become long, and a wire is poured by the flow of resin at the time of transfermold, and adjoining wires will contact and it will become the cause of short [ poor ].

[0009] As a technique of preventing short [ by wire deformation / poor ], many techniques are developed as mentioned above.

[0010] If this invention person had, as a result of carrying out analysis examination of the actual condition of the wire deformation in the manufacture approach of the semiconductor device of the structure of making a lead projecting from each side of a rectangular closure object like QFP (Quad Flatpack Package), respectively, the knowledge of the following things was carried out.

[0011] In the cavity formed by mold metal mold, the gate which pours in resin into a cavity is set as one corner of the closure object formed in the shape of a rectangle at the time of the transfermold in manufacture of the semiconductor device of a QFP mold. Consequently, the big force by the resin streak is added and a wire deformation phenomenon tends to generate the wire in the location near the gate. Moreover, it turned out that the complicated and big force also joins the wire of the location corresponding to this both-sides corner part, and the resin which flowed in the cavity through the gate becomes easy to generate wire deformation in order to change flow in the cavity paries medialis orbitae in the corner part located in the both sides of a cavity.

[0012] Then, it became clear that it could prevent short [ by wire deformation / poor ] by connecting the wire located near the 1 corner part corresponding to the gate with the fixed object which consists of an insulator mutually. Moreover, in order to prevent short [ by wire deformation / poor ] more certainly, it became clear that it is also desirable to carry out connection immobilization of the wires located near the both-sides corner part with a fixed object in addition to the connection immobilization with the fixed object of the wires near [ aforementioned ] the gate.

[0013] The purpose of this invention is to offer the manufacture approach of the semiconductor device which can inhibit the wire deformation by the resin impregnation at the time of transfermold.

[0014] The other purposes and the new description will become clear from description and the accompanying drawing of this specification along [ said ] this invention.

[0015]

[Means for Solving the Problem] It will be as follows if the outline of a typical thing is briefly explained among invention indicated in this application.

[0016] (1) The process which prepares the leadframe which has two or more leads to which a tip is made to face the perimeter of the tab which fixes a semiconductor device, and said tab, The process which fixes said semiconductor device on said tab, and the process which connects said lead with two or more electrodes prepared in the front face of said semiconductor device electrically with a conductive wire, respectively, The process which covers said a part of leadframe by insulating resin, and forms a wrap closure object for a part for said semiconductor device, said wire, and said lead toe at least by transfermold, It is the manufacture approach of a semiconductor device of having the process which carries out cutting removal of the unnecessary leadframe part while cutting the tab \*\*\*\* lead which stands in a row in the lead which projects outside, and said tab from said closure object in a predetermined part. The wires located near the gate where said resin of the mold metal mold in said transfermold is poured in are fixed with an insulating fixed object after the connection process of said wire. Or the wires located in the part which changes the flow direction of said resin within the wires located near the gate where said resin of the mold metal mold in said transfermold is poured in, and mold metal mold are fixed with an insulating fixed object. The manufacture approach of the semiconductor device characterized by performing transfermold after that.

[0017] The wire located in the part which changes the flow direction of said resin is fixed to the tab \*\*\*\* lead which stands in a row in said tab or said tab. It fixes from the fixed portion of said semiconductor device of said wire with said fixed object to a location in the middle of said wire. A nozzle is moved, said each wire is connected, extruding insulating paste-like resin from a nozzle tip, the account insulation resin of back to front is stiffened, and said fixed object is formed.

[0018] (2) The manufacture approach of the semiconductor device which carries out connection

immobilization of the wires which adjoin so that it may go around the edge of said semiconductor chip with a fixed object after the connection process of said wire in the manufacture approach of the semiconductor device the above (1), and is characterized by performing transfermold after that.

[0019] (3) In the manufacture approach of the semiconductor device the above (1), after the connection process of said wire, while piling up an adhesive fixed object with a larger appearance than said semiconductor device on said semiconductor device, make it paste up, fix said all wires, and perform transfermold after that. The fixed object of one configuration of the shape of tabular, the shape of a stitch, and a frame is used as said fixed object. Said fixed object has the part fused with heat, and the part fused by UV irradiation at least in a part, and makes connection with said wire by heating or UV irradiation. Said fixed object puts said fixed object on said wire so that all the edges of said fixed object may project outside the edge of said semiconductor device more greatly than said semiconductor device.

[0020] In the manufacture approach of the semiconductor device the above (1) (4) After the connection process of said wire, While making it spread to extent which supplies insulating paste-like resin on said semiconductor device, sprays a gas on said resin after that, and is protruded in predetermined length from the periphery of said semiconductor device Even the middle of the part which extends on the outside of said semiconductor device from the fixed portion of said semiconductor device of said wire is covered, subsequently said resin is stiffened, a fixed object is formed, and all wires are fixed with this fixed object.

[0021] According to the means of the above (1), the wires located near the gate where said resin of the mold metal mold in transfermold is poured in are fixed with an insulating fixed object after the connection process of the (a) wire. or from fixing with an insulating fixed object, the wires located in the part which changes the flow direction of said resin within the wires located near the gate where said resin of the mold metal mold in said transfermold is poured in, and mold metal mold It can prevent short [ poor ], without wires' contacting or approaching, since the resin which melted at the time of transfermold is maintained with sufficient vigor by spacing predetermined in spacing of wires with a fixed object in a wire train.

[0022] (b) the movement toward the upper and lower sides of a wire since the wire located in the part which changes the flow direction of resin is fixed to a tab or a tab \*\*\*\* lead with a fixed object -- being lost -- said -- it can prevent short [ of a wire / poor ] similarly.

[0023] (c) Since the parts which form a fixed object are 1 thru/or two or more places, working hours are short and can suppress the cost jump of a semiconductor device.

[0024] It can prevent short [ poor ], without wires' contacting or approaching, since according to the means of the above (2) connection immobilization of the wires which adjoin so that it may go around a semiconductor chip after the connection process of a wire is carried out with a fixed object and the resin which melted at the time of transfermold is maintained with sufficient vigor by spacing predetermined in spacing of wires with a fixed object in a wire train.

[0025] From according to the means of the above (3), making it paste up, while piling up a fixed object with a larger appearance than a semiconductor device on the wire on a semiconductor device after the connection process of the (a) wire, and fixing all wires with a fixed object It can prevent short [ poor ], without wires' contacting or approaching, since the resin which melted at the time of transfermold is maintained with sufficient vigor by spacing predetermined in spacing of wires with a fixed object in a wire train.

[0026] (b) Since air escapes from and comes out from a stitch at the time of transfermold in using a stitch-like thing as a fixed object, the closure object which does not contain air bubbles can be formed.

[0027] (c) Since a fixed object is put on a wire so that all the edges of a fixed object may project outside the edge of a semiconductor device more greatly than a semiconductor device, since a wire is supported with a fixed object ranging from the fixed portion to the middle of a semiconductor device, adjoining contact and contiguity of wires stop being able to occur easily, and it can prevent short [ of a wire / poor ].

[0028] While making it spread to extent which supplies insulating paste-like resin on a semiconductor device after the connection process of the (a) wire, sprays a gas on said resin after that, and is protruded in predetermined length from the periphery of a semiconductor device according to the means of the above (4) Even the middle of the part which extends on the outside of a semiconductor device from the fixed portion of the semiconductor device of a wire is covered. subsequently, from stiffening said resin, forming a fixed object and fixing all wires with this fixed object It can prevent short [ poor ], without wires' contacting or



approaching, since the resin which melted at the time of transfermold is maintained with sufficient vigor by spacing predetermined in spacing of wires with a fixed object in a wire train.

[0029]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to a drawing. In addition, in the complete diagram for explaining the gestalt of implementation of invention, what has the same function attaches the same sign, and explanation of the repeat is omitted.

[0030] (Operation gestalt 1) Drawing 1 thru/or drawing 6 are drawings concerning the manufacture approach of the semiconductor device by 1 operation gestalt (operation gestalt 1) of this invention. This operation gestalt 1 explains the example which applied this invention to the manufacture approach of the semiconductor device of a QFP mold.

[0031] The semiconductor device 1 of the QFP mold manufactured by the manufacture approach of the semiconductor device of this operation gestalt 1 consists of two or more leads 3 which project, respectively from the peripheral surface of four sides of the closure object (package) 2 which consists of insulating resin of a flat quadrilateral in appearance, and this closure object 2, as shown in drawing 2. The closure object 2 is formed of transfermold. Moreover, beveling processing is performed and the corner of four sides of the closure object 2 has become an inclined plane. Drawing 2 (a) is the top view of a semiconductor device 1, and (b) of drawing 2 is a typical sectional view. Drawing 2 (c) is the partial sectional view showing the modification of the fixed object which prevents contact of wires.

[0032] While the support plate (tab) 4 which consists of a metal plate is located in the center of abbreviation within said closure object 2, it is fixed to the top face of this tab 4 through the binder which the semiconductor device (semiconductor chip) 5 in which IC (integrated circuit device) etc. was formed does not illustrate. Moreover, a part for the electrode (refer to drawing 1: square part located in a line along the edge of a semiconductor chip although a sign does not give) of a semiconductor chip 5, and the toe of lead 3 located in the closure object 2 is electrically connected with the conductive wire 6. The lead 3 located in the closure object 2 is called an inner lead, and the lead 3 located in the outside of the closure object 2 is called an outer lead. Moreover, the lead 3 (outer lead) which projects in the exterior of the closure object 2 has the gull wing mold structure of having been suitable for the surface mount crooked in the shape of a single step stage on the way.

[0033] With this operation gestalt 1, although especially limitation is not carried out, the tab 4 has small tab structure with a small appearance from the semiconductor chip 5. Small tab structure can fix the semiconductor chip with which sizes differ to the same leadframe from the periphery of a semiconductor chip being the structure where it is located in the outside of a tab, and its versatility of a leadframe is high and it can attain reduction of the manufacturing cost of the part semiconductor device.

[0034] On the other hand, although this is one of the descriptions of this invention, as shown in drawing 2 (b), support immobilization of the adjoining predetermined wire 6 is carried out with the fixed object 7. This fixed object 7 is also located in the closure object 2. The fixed object 7 extrudes paste-like resin (insulating resin) one by one in the shape of yarn from the tip of a nozzle while moving a nozzle in the direction which intersects a wire. Consequently, yarn-like resin adheres to a wire one by one. Then, the fixed object 7 of predetermined die length will be formed by stiffening the resin of the shape of this yarn.

[0035] Paste-like resin uses what has predetermined viscosity, and it is made not to break off between wires. Even if the wires which adjoin with this fixed object 7 come to maintain predetermined spacing and both the whole may move, it is lost that adjoining wires contact. Resin uses the heat-curing mold resin hardened with heat, and the ultraviolet curing mold resin (UV hardening mold resin) hardened by the exposure of ultraviolet rays. Moreover, the heating approach can use the heat transfer heating method which uses a heat stage, a high-frequency-heating method, a lamp heating method, etc.

[0036] After establishing the fixed object 7, the closure object 2 is formed of transfermold. Drawing 1 is drawing showing the inner lead part in the lead 3 at the time of transfermold, the cavity 20 of the mold metal mold with which the closure object 2 is formed, the gate 21 that leads resin to this cavity 20, and the vent 22 which misses the air in a cavity 20 outside, and is the mimetic diagram showing physical relationship with the fixed object 7.

[0037] The circular tab 4 is supported by the tab \*\*\*\* lead 8 arranged 90 degrees at interval, although

especially limitation is not carried out. Moreover, it is connected by the dam 9 between leads 3 and between the lead 3 and the tab \*\*\*\* lead 8. Although the dam 9 has predetermined width of face, in drawing 1, only the periphery is drawn, among those the periphery has extended along with the periphery of a cavity 20.

[0038] With this operation gestalt 1, the fixed object 7 is established corresponding to three corners of the square closure object 2, as shown in drawing 2 (a) and drawing 1. In drawing 1 and drawing 2 (a), make an upper left corner into the 1st corner A, and let each corner be the 2nd corner B, the 3rd corner C, and the 4th corner D in the clockwise direction. That is, an upper right corner turns into the 2nd corner B, a lower right corner turns into the 3rd corner C, and a lower left corner turns into the 4th corner D.

[0039] As the 1st corner A is shown in drawing 1, it is the corner which stands in a row to the gate 21 where resin is poured in at the time of transfer mold, and the 3rd corner C is a corner which stands in a row in a vent 22. In order to form the closure object 2, the resin which melted from the gate 21 as shown in arrow-head 10a is poured in into a cavity 20.

[0040] The resin poured in from the 1st corner A of the square cavity 20 goes to the 3rd corner C located on the same diagonal line as the 1st corner A with breadth in a cavity 20 at a flabellate form form. Moreover, since the resin which advances in accordance with the side attachment wall from the side attachment wall from the 1st corner A to the 2nd corner B and the 1st corner A to the 4th corner D has a cavity wall ahead [ the ], as the flow direction of resin shows arrow-head 10b, it changes. After that, resin enters in a vent 22, as shown in arrow heads 10c and 10d. Consequently, the inside of a cavity 20 will be buried with resin, and the closure object 2 will be formed of hardening processing of resin.

[0041] As a result of this invention person's doing analysis examination about the correlation of generating with the flow situation of such resin, and short [ of a wire / poor ], it contacted mutually or it turned out that the wires located in the about 21 gate and the wires which are located in the part which changes the flow direction of resin a lot are easy to approach.

[0042] The wire located near the corner part (the 1st corner A) corresponding to the gate 21 where resin is pressed fit has the high frequency where a wire moves violently vertically and horizontally and adjoining wires contact in order to receive the flow of resin directly. Although it can be recollected that the wires located near the 1st corner A contact, by this analysis examination, vertically and horizontally, the wire ran also by the part (the 2nd corner B, the 4th corner D) which changes the flow direction of resin violently, and was cut by adjoining wires contacting in it.

[0043] Then, as this invention person showed drawing 1, while connecting the wire 6 located in the about 21 gate with the fixed object 7, the flow direction of resin carries out connection support also of the wire 6 located in the part corresponding to the 2nd corner B which changes a lot, and the 4th corner D with the fixed object 7, respectively, and it was made for wires not to contact. The fixed object 7 is formed in predetermined height as shown in drawing 2 (c).

[0044] In addition, you may make it fix the lower limit to the tab \*\*\*\* lead 8, using the interstitial segment of the fixed object 7 as stanchion 7a. thus, since the fixed object 7 serves as the shape of T character by which the lower limit was fixed to the tab \*\*\*\* lead 8 by carrying out, as for the wire 6 supported by the amount of [ which extends to the horizontal direction of T characters ] fixed soma, respectively, fluctuation of the vertical direction is inhibited -- things -- \*\* A wire 6 moves caudad and it stops thereby, contacting a semiconductor chip 5.

[0045] Below, the manufacture approach of the semiconductor device of this operation gestalt 1 is explained, referring to the process sectional view of drawing 3.

[0046] As shown in drawing 3 (a), after preparing a leadframe 12, it fixes through the jointing material for corrugated fibreboard which does not illustrate a semiconductor chip 5 on the tab 4 of each unit leadframe partial 12a of a leadframe 12. As a leadframe 12, in order to raise the versatility of a leadframe, the thing of small tab structure with a tab smaller than a semiconductor chip is used. In small tab structure, wire length becomes long and adoption of the fixed object by this invention serves as a technique effective for preventing short [ by wire deformation / poor ]. Moreover, a part for the toe of lead 3 is electrically connected with the electrode which a semiconductor chip 5 does not illustrate with the conductive wire 6.

[0047] The leadframe 12 is a matrix leadframe as shown in drawing 4. Drawing 4 shows a part of leadframe 12, and this matrix leadframe can carry out 2 train two or more ream arrangement of the unit leadframe

partial 12a, and can manufacture two or more semiconductor devices 1 from the leadframe 12 of one sheet. Drawing 4 and drawing 5 show only the one-line part of a leadframe 12.

[0048] A leadframe 12 is formed by carrying out patterning of an iron-nickel system alloy plate with a thickness of about 0.125-0.2mm, a copper plate, the copper alloy plate, etc. with etching or a precision press. Unit leadframe partial 12a of the leadframe 12 shown in drawing 4 consists of the thin tab \*\*\*\* lead 8 of four arranged every 90 degrees, a thin dam 9 arranged so that between the adjoining tab \*\*\*\* leads 8 may be connected, and two or more leads 3 which intersect this dam 9 (rectangular cross) while supporting the circular tab 4 located at the core of unit leadframe partial 12a, and this tab 4.

[0049] The lead 3 located in the outside of a dam 9 is a part used as an outer lead, and has extended in parallel in pitches [ mutual ]. The lead part inside a dam 9 is crooked so that it may not escape from the closure object 2, and so that it may stand in a line at intervals of predetermined along the edge of a semiconductor chip 5, while the tip constitutes the wire connection part which connects a wire.

[0050] The guide holes 13a, 13b, and 13c are formed along the edge in alignment with the longitudinal direction of a leadframe 12. These guide holes 13a, 13b, and 13c are used in the case of migration of a leadframe 12, or positioning.

[0051] Drawing 5 is the top view of a leadframe 12 which fixed the semiconductor chip 5 on the tab 4, and connected the inner edge of lead 3 with the electrode of a semiconductor chip 5 with the wire 6.

[0052] As shown in drawing 3 (b), while extracting next, without breaking off insulating paste-like resin 15 from the tip (lower limit) of the nozzle 14 of a dispenser, a nozzle 14 is moved, adjoining wires are connected, and hardening processing is carried out, and the fixed object 7 is formed. The ultraviolet curing form resin which will be hardened if the thing to harden by BEKU processing or ultraviolet rays is irradiated is used for paste-like resin 15.

[0053] The fixed object 7 is established so that the flow direction of resin may connect the wires located in the part corresponding to the 2nd corner B which changes a lot, and the 4th corner D, while preparing so that the wires located in the part corresponding to the gate 21 may be connected as shown in drawing 1.

[0054] Next, as shown in drawing 3 (c), the closure object 2 formed with insulating resin of transfermold is formed. The closure object 2 comes to cover a part for a tab 4, a semiconductor chip 5, a wire 6, and the toe of lead 3. Drawing 6 is the mimetic diagram showing a mold clamp meal and the condition of carrying out transfermold for a leadframe 12 in the mold metal mold 16 of transfermold equipment.

[0055] A leadframe 12 is pinched between female mold 16a of the mold metal mold 16, and punch 16b. It is located by the amount of [ a semiconductor chip 5, a wire 6, the fixed object 7, and / of lead 3 ] toe in the cavity 20 formed by the mold metal mold 16. Insulating resin 23 is poured in from the gate 21 which stands in a row in a cavity 20. The air in a cavity 20 is extruded outside from the vent 22 which stands in a row in a cavity 20. A cavity 20 can be made full of resin 23 by pouring in resin 23 up to vent 22 part. By carrying out cure processing, resin 23 will be hardened and the closure object 2 will be formed in cavity 20 part.

[0056] Since connection support is carried out with the fixed object 7, the wires which adjoin with the resin 23 sent in with sufficient vigor from the gate 21 do not contact, or the wire 6 located in the part corresponding to the gate 21 at the time of said transfermold does not generate contiguity of both to the extent that it is connected with short [ poor ]. Contact and contiguity of adjoining wires also stop moreover, also occurring from connection support also of the wire 6 located in the part corresponding to the 2nd corner B where the flow direction of resin changes a lot, and the 4th corner D being carried out with the fixed object 7, respectively.

[0057] As shown in drawing 2 (c), when that lower limit is fixed to the tab \*\*\*\* lead 8, using the interstitial segment of the fixed object 7 as stanchion 7a, the wire 6 which will not move up and down and is supported with the fixed object 7 as a result will not move up and down, either, and the fixed object 7 stops in addition, also generating the fault of a wire 6 contacting a semiconductor chip 5 by stanchion 7a. What is necessary is to stop said nozzle 14 right above the tab \*\*\*\* lead 8, and just to form, when it carries out multiple from the tip of a nozzle 14, as sequential paste-like resin 15 is piled up in order to form stanchion 7a. Thus, in order to carry out multiple [ of the paste-like resin 15 ] in piles, it is necessary to choose the viscosity of paste-like resin 15 suitably.

[0058] Next, as shown in drawing 3 (d), plating processing called sheathing plating is performed. For

example, PbSn plating is formed although illustration is not carried out to the front face of lead 3. In case this PbSn plating carries out the surface mount of the semiconductor device 1 to wiring substrates, such as a mother board, it is used.

[0059] Next, while carrying out cutting removal of the unnecessary leadframe part, the lead 3 which projects from the peripheral surface of the closure object 2 is fabricated, and as shown in drawing 3 (e), the semiconductor device 1 of a gull wing mold is manufactured. This cutting and shaping serve as processing of cutting removal of the dam which connects for example, leads, a lead, and a tab \*\*\*\* lead, cutting of a lead, shaping of a lead, cutting of the lead tip which makes lead die length regularity, etc.

[0060] According to this operation gestalt 1, it has the following effectiveness.

[0061] (1) The wires located in the about 21 gate where the resin 23 in the mold metal mold 16 is poured in are being fixed with the insulating fixed object 7 at the time of transfermold. Therefore, contiguity of the wires which lead to poor [ of the adjoining wires resulting from wire deformation like before / contact or short / poor ] also stops also occurring, and improvement in the manufacture yield of a semiconductor device can be attained.

[0062] (2) The wires located in the part which changes the flow direction of the resin 23 in the mold metal mold 16 are being fixed with the insulating fixed object at the time of transfermold. Therefore, contiguity of the wires which lead to poor [ of the adjoining wires resulting from wire deformation like before / contact or short / poor ] also stops also occurring, and improvement in the manufacture yield of a semiconductor device can be attained.

[0063] (3) With the structure where the fixed object 7 is fixed to the tab \*\*\*\* lead 8 through stanchion 7a, vertical movement of a wire 6 stops occurring, and a wire 6 can also inhibit the fault of contacting a semiconductor chip 5.

[0064] (4) Since the parts which form the fixed object 7 are 1 thru/or two or more places, working hours are short and can suppress the cost jump of a semiconductor device 1.

[0065] Drawing 7 is the typical top view showing correlation with the gate of the transfermold condition by the 1st modification in the manufacture approach of the semiconductor device of this operation gestalt 1, and the fixed object holding a wire. In the \*\*\*\* 1 modification, the wire 6 of the location corresponding to the part from the 1st corner A to the 2nd corner B and the 4th corner D is connected with the fixed object 7. It can prevent short [ at the time of the transfermold of a wire 6 / poor ] also in this example. Of course, you may make it fix the fixed object 7 to the tab \*\*\*\* lead 8 through a stanchion also in this example like the operation gestalt 1.

[0066] It has effectiveness (1) - (4) described above also in this 1st modification.

[0067] Drawing 8 is the typical top view showing correlation with the gate of the transfermold condition by the 2nd modification in the manufacture approach of the semiconductor device of this operation gestalt 1, and the fixed object holding a wire. In the \*\*\*\* 2 modification, the wire 6 of the location corresponding to the 1st corner A is connected with the fixed object 7. It can prevent short [ at the time of the transfermold of a wire 6 / poor ] also in this example. Of course, you may make it fix the fixed object 7 to the tab \*\*\*\* lead 8 through a stanchion also in this example like the operation gestalt 1. This configuration is suitable when it is manufacture of a comparatively long, the manufacture approach of a semiconductor device that the transfer pressure of the resin 23 made to pour in from the gate 21 should hold only an about 21-gate wire comparatively small, for example, the distance between the gate and a wire, semiconductor device.

[0068] According to the 2nd modification, it has the above mentioned effectiveness (1) and (3).

[0069] Drawing 9 is the typical top view showing correlation with the gate of the transfermold condition by the 3rd modification in the manufacture approach of the semiconductor device of this operation gestalt 1, and the fixed object holding a wire. In the \*\*\*\* 3 modification, the wire 6 of the location corresponding to each corner is connected with the fixed object 7. It can prevent short [ at the time of the transfermold of a wire 6 / poor ] also in this example. Of course, you may make it fix the fixed object 7 to the tab \*\*\*\* lead 8 through a stanchion also in this example like the operation gestalt 1.

[0070] It has effectiveness (1) - (4) described above also in the 3rd modification.

[0071] Drawing 10 thru/or drawing 12 are drawings concerning the manufacture approach of the semiconductor device which are other operation gestalten (operation gestalt 2) of this invention. (Operation

gestalt 2) The typical top view in which drawing 10 shows correlation with the gate of a transfermold condition, and the fixed object holding a wire, <A HREF="/Tokujitu/tjitemdrw.ipdl?N0000=237&N0500=1E\_N/;>;<97?6///&N0001=301&N05 52=9&N0553=000013" TARGET="tjitemdrw"> drawing 11 is the typical top view showing the migration locus of the nozzle which forms the fixed object holding a wire.

[0072] With this operation gestalt 2, as shown in drawing 10, connection immobilization of the wires which adjoin so that it may go around the edge of a semiconductor chip 5 is carried out with the fixed object 7, and transfermold is performed after that. In this case, in order to connect the fixed object 7 to the predetermined tab \*\*\*\* lead 8 through that stanchion, on each tab \*\*\*\* lead 8, a nozzle is located on the long time amount tab \*\*\*\* lead 8, and a stanchion is formed. That is, it is oscillating actuation for \*\*, \*\*, \*\*, and \*\* to form a stanchion etc. And paste-like resin is applied, putting in these repeat actuation on the way.

[0073] Spreading of the paste-like resin which consists of insulating resin is performed so that a semiconductor chip 5 may be surrounded by making the 1st corner A into a terminal point with the 1st corner A as the starting point. Moreover, the paste-like resin supplied from a nozzle tip like a picture drawn without lifting the brush from the paper is performed in the meantime, without making it break off.

[0074] At the 1st corner A which is an origin, as shown in \*\*, after making into predetermined height the paste-like resin which a nozzle is located on the tab \*\*\*\* lead 8 located in the 1st corner A for a long time, and applies it, a nozzle is turned to the 4th corner D from the 1st corner A, and it moves (refer to \*\*). At the 4th corner D, as shown in \*\* like the above, after making into predetermined height the paste-like resin which a nozzle is located on the tab \*\*\*\* lead 8 located in the 4th corner D for a long time, and applies it, a nozzle is turned to the 3rd corner C from the 4th corner D, and it moves (refer to \*\*). At the 3rd corner C, as shown in \*\* like the above, after making into predetermined height the paste-like resin which a nozzle is located on the tab \*\*\*\* lead 8 located in the 3rd corner C for a long time, and applies it, a nozzle is turned to the 2nd corner B from the 3rd corner C, and it moves (refer to \*\*). At the 2nd corner B, as shown in \*\* like the above, after making into predetermined height the paste-like resin which a nozzle is located on the tab \*\*\*\* lead 8 located in the 2nd corner B for a long time, and applies it, a nozzle is turned to the 1st corner A from the 2nd corner B, and it moves (refer to \*\*).

[0075] The stanchion which leads to the fixed object 7 which fixes a wire 6 by carrying out hardening processing of the paste-like resin next, or the tab \*\*\*\* lead 8 will be formed. Consequently, the fixed object 7 of the shape of endless [ which is connected 1 round so that a semiconductor chip 5 may be surrounded ] can be formed (refer to drawing 10 ). The ultraviolet curing mold resin which will be hardened if resin and ultraviolet rays of a heat-curing mold which are hardened by applying heat are irradiated is used for paste-like resin. And corresponding to the used resin, heating or ultraviolet rays is irradiated at the time of hardening processing of resin, and it attains hardening of resin.

[0076] Drawing 12 is the sectional view of the semiconductor device 1 manufactured by the manufacture approach of the semiconductor device of this operation gestalt 2. The left half of this drawing shows the fixed object 7 fixed to the tab \*\*\*\* lead 8 through stanchion 7a, and the right half of this drawing shows the fixed object 7 which supports a wire 6. A wire 6 is maintained by predetermined height by existence of stanchion 7a.

[0077] With this operation gestalt 2, since it is fixed to the tab \*\*\*\* lead 8 through the stanchion which wires 6 are supported [ no ] with the fixed object 7, and also illustrates the fixed object 7, the wires which adjoin by the flow of the resin which flows in a cavity at the time of transfermold can approach, or contacting can be prevented. Moreover, a wire 6 can also prevent defect generating in contact with a semiconductor chip 5, without a wire 6 becoming low by mediation of a stanchion.

[0078] It can prevent short [ poor ], without wires' contacting or approaching, since according to this operation gestalt 2 connection immobilization of the wires which adjoin so that it may go around a semiconductor chip after the connection process of a wire is carried out with a fixed object and the resin which melted at the time of transfermold will be maintained with sufficient vigor by spacing predetermined in spacing of wires with a fixed object in a wire train, if it puts in another way.

[0079] Also in this operation gestalt 2, it has effectiveness (1) - (3) which was indicated with the above mentioned operation gestalt 1.

[0080] Drawing 13 is the typical top view showing correlation with the gate of the transfermold condition by

the 1st modification in the manufacture approach of the semiconductor device of this operation gestalt 2, and the fixed object holding a wire.

[0081] Drawing 14 is drawing concerning the 2nd modification in the manufacture approach of the semiconductor device of this operation gestalt 2, and the fluoroscopy top view of the semiconductor device with which drawing 14 was manufactured, and drawing 15 are the sectional views of a semiconductor device. In the \*\*\*\* 2 modification, it is the example which formed the fixed object 7 in three-fold. This configuration can prevent the poor contact and poor contiguity of wires certainly. In the \*\*\*\* 2 modification, three places of the part into which the wire 6 fixed to the semiconductor chip 5 started, and the wire part fixed to the part and the lead 3 in the middle of the wire 6 are being fixed with the fixed object 7.

[0082] The configuration which fixes two places, the wire part fixed to the semiconductor chip 5 and the wire part fixed to the lead 3, with the fixed object 7 as other configurations is also employable. Since the inner lead section is also fixed to coincidence, this configuration has effectiveness in inner lead deformation prevention. Moreover, it makes natural adoption of a configuration of having combined each [ these ] configuration and is effective. Short [ of the wires to which any configuration originates in transfermold with the fixed endless-like object 7 / poor ] can be prevented.

[0083] (Operation gestalt 3) Drawing 16 thru/or drawing 18 are drawings concerning the manufacture approach of the semiconductor device which are other operation gestalten (operation gestalt 3) of this invention, and the typical fluoroscopy top view in which drawing 16 shows correlation with the gate of a transfermold condition and the fixed object holding a wire, the sectional view of the semiconductor device with which drawing 17 was manufactured, and drawing 18 are some [ in the manufacture approach of a semiconductor device ] process sectional views.

[0084] By the manufacture approach of the semiconductor device of this operation gestalt 3, as shown in drawing 18 (a), the leadframe 12 which fixed the semiconductor chip 5 on the tab 4 of each unit leadframe partial 12a, and connected the lead 3 with the electrode of a semiconductor chip 5 with the wire 6 is prepared. Then, the adhesive fixed object motherboard 30 with a larger appearance than a semiconductor chip 5 is piled up on a semiconductor chip 5. Inside the periphery of a semiconductor chip 5, a wire 6 is connected, respectively, and since the wire 6 drew the loop formation and it has extended in the lead 3 side, said fixed object motherboard 30 appears on said two or more wires 6, and will be in the condition of not contacting the direct semiconductor chip 5.

[0085] As for the fixed object motherboard 30, what has a larger appearance than a semiconductor chip 5 is used as mentioned above. Then, the fixed object motherboard 30 is piled up on a semiconductor chip 5 so that the periphery of the fixed object motherboard 30 may project rather than the rim of a semiconductor chip 5.

[0086] Moreover, although especially limitation is not carried out, if the fixed object motherboard 30 is heated to predetermined temperature, it is formed by the insulating resin which carries out softening fusion. Moreover, the thickness of the fixed object motherboard 30 is not limited that what is necessary is [ especially ] just extent which can fix a wire 6. For example, when it melts and reaches to the front face of a semiconductor chip 5 so that it may mention later, it is necessary to use the thing before and behind the thickness corresponding to the height of a wire loop formation to cover a wire 6 to the summit part of the loop formation. The configuration of the fixed object motherboard 30 serves as a plate formed of four radii parts as shown in drawing 16.

[0087] Next, as shown in drawing 18 (b), said fixed object motherboard 30 is heated to predetermined temperature, and softening melting of the fixed object motherboard 30 is carried out. The fixed object motherboard 30 descends so that a wire 6 may be embedded, as a result of the whole's carrying out softening fusion, and it arrives at the front face of a semiconductor chip 5. Moreover, by suspending heating, this softening melt hardens and the fixed object 7 is formed. By selection of the use quality of the material, heating temperature, etc., the fixed object 7 is wearing the top face of a semiconductor chip 5, and covers wire 6 part, further, from the periphery of a semiconductor chip 5, is disturbed and also comes to cover wire 6 part. The part from the wire part fixed to a semiconductor chip 5 to the middle of the loop formation of a wire 6 will be fixed with the fixed object 7 by this fixed object 7, and wire spacing will be maintained by predetermined spacing with it.

[0088] In addition, although the fixed object motherboard 30 showed the example of the thermoplastic matter with this operation gestalt, the fixed object motherboards 30 may be the thermosetting matter and the matter of UV hardening mold that what is necessary is just to be able to fix a wire.

[0089] Next, as shown in drawing 18 (c) and drawing 16, by transfermold, the closure object 2 which consists of insulating resin is formed, and a part for a tab 4, a semiconductor chip 5, a wire 6, and the toe of lead 3 is covered. Drawing 16 is the mimetic diagram showing the condition of the inner lead part at the time of transfermold, and resin is poured in into a cavity 20 from the gate 21, and it forms the closure object 2.

[0090] Since a wire 6 is supported with the fixed object 7 from the connection place of a semiconductor chip 5 covering the part projected from the periphery edge of a semiconductor chip 5, wire deformation stops being able to occur easily and the contiguity phenomenon beyond the contact and the need for wires stops generating it, since the periphery edge of the fixed object 7 serves as structure projected rather than the periphery of a semiconductor chip 5.

[0091] Then, although illustration is not carried out, sheathing plating is performed, the lead 3 which projects further from cutting removal of an unnecessary leadframe part and the peripheral surface of the closure object 2 is fabricated, and the semiconductor device 1 of a gull wing mold as shown in drawing 17 is manufactured.

[0092] According to this operation gestalt 3, since the fixed object 7 covers a wire 6 so that all the edges of the fixed object 7 may project outside the edge of a semiconductor chip 5 more greatly than a semiconductor chip 5, since a wire 6 is supported with the fixed object 7 ranging from the fixed portion to the middle of a semiconductor chip 5, adjoining contact and contiguity of wires stop being able to occur easily, and it can prevent short [ of a wire / poor ]. Moreover, it has the effectiveness (1) indicated with the operation gestalt 1, and (2).

[0093] In the configuration of this operation gestalt 3, if polyimide system resin is used as an example of the fixed object motherboard 30, it will have the fixed object 7 of the good polyimide system resin of adhesion on both closure objects 2 which consist of a semiconductor chip front face and resin, and the reflow crack by the solder reflow will not be generated that it is hard to produce a clearance between the closure object 2 and the fixed object 7 and between the fixed object 7 and a semiconductor chip front face.

[0094] Since especially the adhesion with the closure object 2 (closure resin) which consists of this plasma night RAIDO film and resin when using the plasma night RAIDO film as final passivation film on the front face of a semiconductor chip is not not much good, moisture collects among them, and when this moisture expands at the time of a reflow, the problem of making closure resin generate a crack can be prevented.

[0095] As a fixed object motherboard 30, the whole may carry out softening fusion by approaches other than heating. For example, light energies, such as UV, are used. Moreover, it may form by the softening fusion zone prepared in the inferior surface of tongue of Itabe who changes neither with heating nor UV irradiation, and this Itabe as a fixed object motherboard 30, or Itabe and jointing prepared in this Itabe's inferior surface of tongue (adhesive tape), and immobilization with a wire may be attained by Itabe's softening fusion zone or jointing at the bottom.

[0096] Moreover, especially as a fixed object motherboard 30, the shape of the shape of a stitch and a frame etc. is not limited.

[0097] Drawing 19 is the typical fluoroscopy top view showing correlation with the gate of the transfermold condition by the 1st modification in the manufacture approach of the semiconductor device of this operation gestalt 3, and the fixed object holding a wire. The 1st modification of this operation gestalt 3 is an example which formed the fixed object 7 as a fixed object motherboard 30 using the stitch-like thing.

[0098] In this example, since the fixed object 7 is stitch structure, in order that air may escape from and come out from a stitch at the time of transfermold in addition to the effectiveness in the operation gestalt 3, there is utility which can form the closure object which does not contain air bubbles.

[0099] Drawing 20 is some [ in the manufacture approach of the semiconductor device by the 2nd modification by this operation gestalt 3 ] process sectional views. In the 2nd modification of this operation gestalt 3, the frame-like thing is used as a fixed object motherboard 30. And it piles up on a semiconductor chip 5 so that it may be located in the field to which the amount of frame part projects several mm from the periphery of a semiconductor chip 5 with the fixed object motherboard 30 of the shape of this frame



including the wire connection part of a semiconductor chip 5 as shown in drawing 20 (a).

[0100] Next, like the operation gestalt 3, by softening melting of the fixed object motherboard 30, and hardening processing, as shown in drawing 20 (b), the fixed object 7 is formed on a semiconductor chip 5. This fixed object 7 becomes the structure which covers completely the wire part which was continued and formed in the field jutted out more slightly than the periphery of a semiconductor chip 5 from the part used as the predetermined distance inside from the periphery of a semiconductor chip 5, and was fixed to the semiconductor chip 5 with the fixed object 7, and is fixed.

[0101] Next, as shown in drawing 20 (c), by transfermold, the closure object 2 which consists of insulating resin is formed, and a part for a tab 4, a semiconductor chip 5, a wire 6, and the toe of lead 3 is covered.

[0102] Then, although illustration is not carried out, sheathing plating is performed, the lead 3 which projects further from cutting removal of an unnecessary leadframe part and the peripheral surface of the closure object 2 is fabricated, and the semiconductor device 1 of a gull wing mold as shown in drawing 17 is manufactured.

[0103] Also according to the 2nd modification of this operation gestalt 3, the wire deformation at the time of transfermold can be prevented, and the short prevention between wires or a wire, and a semiconductor chip can be attained.

[0104] Drawing 21 is some [ in the manufacture approach of the semiconductor device by the 3rd modification by this operation gestalt 3 ] process sectional views. In the 3rd modification of this operation gestalt 3, adhesion liquid 41 is infiltrated into yarn 40, this yarn 40 is carried on a wire 6, as shown in drawing 21 (a), and that fixed object 7 as carried out afterbaking processing, made a wire 6 carry out adhesion hardening of said adhesion liquid 41 and shown in drawing 21 (b) is formed. Yarn 40 may be an endless-like thing, or may be one yarn.

[0105] Also according to the 3rd modification of this operation gestalt 3, the wire deformation at the time of transfermold can be prevented, and the short prevention between wires or a wire, and a semiconductor chip can be attained.

[0106] (Operation gestalt 4) Drawing 22 (a) - (c) is some [ in the manufacture approach of the semiconductor device which are other operation gestalten (operation gestalt 4) of this invention ] process sectional views.

[0107] As shown in drawing 22 (a), after this operation gestalt 4 supplies so much the paste-like resin 50 which consists of insulating resin from the nozzles 51, such as a dispenser, on a semiconductor chip 5 to the leadframe 12 (unit leadframe partial 12a) which wirebonding ended, as shown in drawing 22 (b), it sprays Ayr 53 on the front face of paste-like resin 50 from a nozzle 52, and opens paste-like resin 50.

[0108] paste-like resin 50 -- abbreviation -- while spreading a semiconductor chip 5 top level, it is made for the periphery to project rather than the periphery of a semiconductor chip 5 This protrusion is attained by selection of the viscosity of the paste-like resin to be used etc. Moreover, spreading paste-like resin 50 comes to cover completely the wire part connected to a semiconductor chip 5, as a result of being supplied so much. A wire 6 is embedded by paste-like resin 50 from the connection part of a semiconductor chip 5 to a part the middle with spreading paste-like resin 50.

[0109] Next spreading paste-like resin 50 is stiffened and the fixed object 7 is formed. This fixed object 7 will be continued and fixed to the wire part which projects on the outside of a semiconductor chip 5 from the place connected to the semiconductor chip 5 of a wire 6. In the case of the resin which hardening processing changes with used resin quality of the materials, and the case of ultraviolet curing mold resin makes harden resin by UV irradiation, and is hardened with heat, resin is stiffened by heat-treatment.

[0110] Next, as shown in drawing 22 (c), by transfermold, the closure object 2 which consists of insulating resin is formed, and a part for a tab 4, a semiconductor chip 5, a wire 6, and the toe of lead 3 is covered.

[0111] Then, although illustration is not carried out, sheathing plating is performed, the lead 3 which projects further from cutting removal of an unnecessary leadframe part and the peripheral surface of the closure object 2 is fabricated, and a semiconductor device 1 is manufactured.

[0112] According to this operation gestalt 4, the paste-like resin 50 which consists of insulating resin is supplied on a semiconductor chip 5 after the connection process of a wire. While making it spread to extent which sprays Ayr (gas) 53 on paste-like resin 50 after that, and is protruded in predetermined length from the



periphery of a semiconductor chip 5 Even the middle of the part which extends on the outside of a semiconductor chip 5 from the fixed portion of the semiconductor chip 5 of a wire 6 is covered. subsequently, from stiffening paste-like resin 50, forming the fixed object 7, and fixing all the wires 6 with this fixed object 7 It can prevent short [ poor ], without wires' contacting or approaching, since the resin which melted at the time of transfermold is maintained with sufficient vigor by spacing predetermined in spacing of wires with the fixed object 7 in a wire train.

[0113] Although invention made by this invention person above was concretely explained based on the operation gestalt, it cannot be overemphasized that it can change variously in the range which this invention is not limited to the above-mentioned operation gestalt, and does not deviate from the summary.

[0114]

[Effect of the Invention] It will be as follows if the effectiveness acquired by the typical thing among invention indicated in this application is explained briefly. This invention is not the object limited to the configuration which attains all the effectiveness indicated here, but is an object which also includes the configuration which attains a part of effectiveness indicated here as a configuration of this invention.

[0115] (1) According to this invention, since the wire deformation by the resin impregnation at the time of transfermold can be inhibited, the short-circuit between wires and the short-circuit between a wire and a semiconductor device can be prevented, and the semiconductor device which was excellent in quality can be manufactured by the high yield.

[0116] (2) The above (1) can also attain reduction of the manufacturing cost of a semiconductor device from the improvement in the manufacture yield.

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[Translation done.]

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] It is the typical top view showing correlation with the gate of the transfermold condition in the manufacture approach of the semiconductor device which is 1 operation gestalt (operation gestalt 1) of this invention, and the fixed object holding a wire.

[Drawing 2] the top view of the semiconductor device manufactured by the manufacture approach of the semiconductor device of this operation gestalt 1, and a typical sectional view -- and it is an expanded sectional view a part.

[Drawing 3] It is a sectional view in manufacture approach \*\*\*\* each manufacture phase of the semiconductor device of this operation gestalt 1.

[Drawing 4] It is the top view showing a part of leadframe used by the manufacture approach of the semiconductor device of this operation gestalt 1.

[Drawing 5] It is the top view of the leadframe which immobilization of a semiconductor device and connection of a wire ended in the manufacture approach of the semiconductor device of this operation gestalt 1.

[Drawing 6] It is the typical sectional view showing the transfermold condition in the manufacture approach of the semiconductor device of this operation gestalt 1.

[Drawing 7] It is the typical top view showing correlation with the gate of the transfermold condition by the 1st modification in the manufacture approach of the semiconductor device of this operation gestalt 1, and the fixed object holding a wire.

[Drawing 8] It is the typical top view showing correlation with the gate of the transfermold condition by the 2nd modification in the manufacture approach of the semiconductor device of this operation gestalt 1, and the fixed object holding a wire.

[Drawing 9] It is the typical top view showing correlation with the gate of the transfermold condition by the 3rd modification in the manufacture approach of the semiconductor device of this operation gestalt 1, and the fixed object holding a wire.

[Drawing 10] It is the typical top view showing correlation with the gate of the transfermold condition in the manufacture approach of the semiconductor device which are other operation gestalten (operation gestalt 2) of this invention, and the fixed object holding a wire.

[Drawing 11] It is the typical top view showing the migration locus of the nozzle which forms the fixed object which holds a wire in this operation gestalt 2.

[Drawing 12] It is the sectional view of the semiconductor device manufactured according to this operation gestalt 2.

[Drawing 13] It is the typical top view showing correlation with the gate of the transfermold condition by the 1st modification in the manufacture approach of the semiconductor device of this operation gestalt 2, and the fixed object holding a wire.

[Drawing 14] It is the fluoroscopy top view of the semiconductor device manufactured according to the 2nd modification in the manufacture approach of the semiconductor device of this operation gestalt 2.

[Drawing 15] It is the sectional view of the semiconductor device manufactured according to said 2nd modification by this operation gestalt 2.

[Drawing 16] It is the typical fluoroscopy top view showing correlation with the gate of the transfer mold condition in the manufacture approach of the semiconductor device which are other operation gestalten (operation gestalt 3) of this invention, and the fixed object holding a wire.

[Drawing 17] It is the sectional view of the semiconductor device manufactured according to this operation gestalt 3.

[Drawing 18] They are some [ in the manufacture approach of the semiconductor device of this operation gestalt 3 ] process sectional views.

[Drawing 19] It is the typical fluoroscopy top view showing correlation with the gate of the transfer mold condition by the 1st modification in the manufacture approach of the semiconductor device of this operation gestalt 3, and the fixed object holding a wire.

[Drawing 20] They are some [ in the manufacture approach of the semiconductor device by the 2nd modification by this operation gestalt 3 ] process sectional views.

[Drawing 21] They are some [ in the manufacture approach of the semiconductor device by the 3rd modification by this operation gestalt 3 ] process sectional views.

[Drawing 22] They are some [ in the manufacture approach of the semiconductor device which are other operation gestalten (operation gestalt 4) of this invention ] process sectional views.

[Description of Notations]

1 [ -- Tab, ] -- A semiconductor device, 2 -- A closure object (package), 3 -- A lead, 4 5 [ -- Stanchion, ] -- A semiconductor device (semiconductor chip), 6 -- A wire, 7 -- A fixed object, 7a 8 [ -- Unit leadframe part, ] -- A tab \*\*\*\* lead, 9 -- A dam, 12 -- A leadframe, 12a 13a, 13b, 13c -- A guide hole, 14 -- A nozzle, 15 -- Paste-like resin, 16 [ -- A cavity, 21 / -- The gate, 22 / -- A vent, 23 / -- Resin, 30 / -- A fixed object motherboard, 40 / -- Yarn, 41 / -- Adhesion liquid, 50 / -- 51 Paste-like resin, 52 / -- A nozzle, 53 / -- Ayr. ] -- Mold metal mold, 16a -- Female mold, 16b -- A punch, 20

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[Translation done.]

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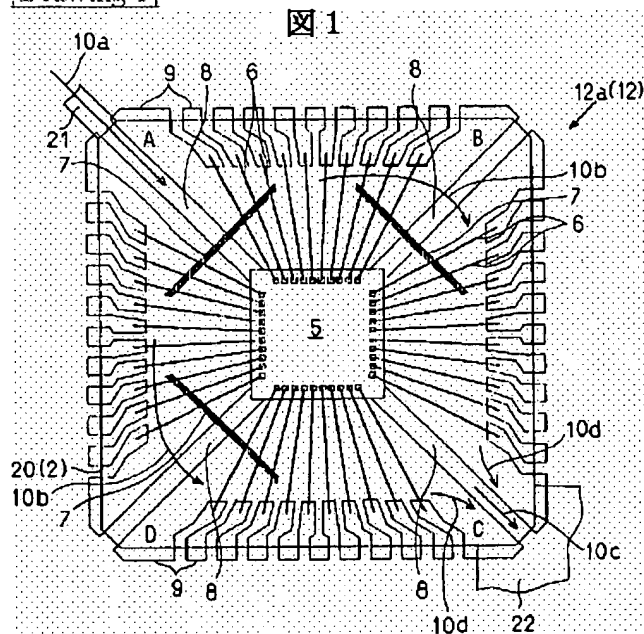
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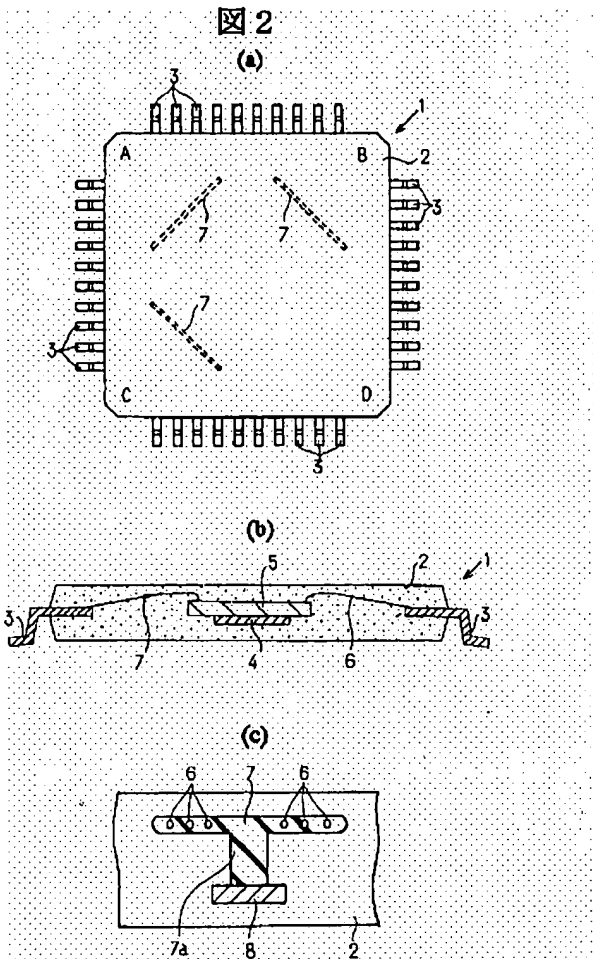
DRAWINGS

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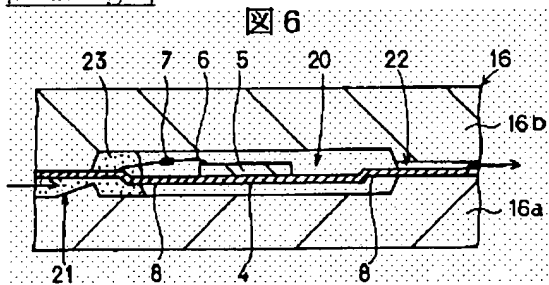
[Drawing 1]



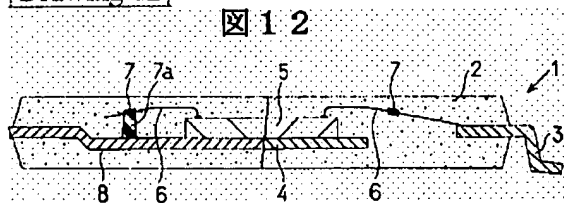
[Drawing 2]



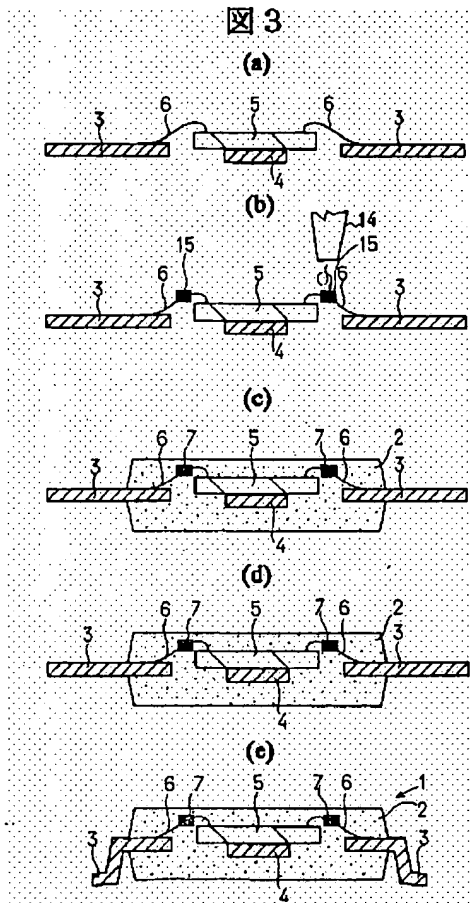
[Drawing 6]



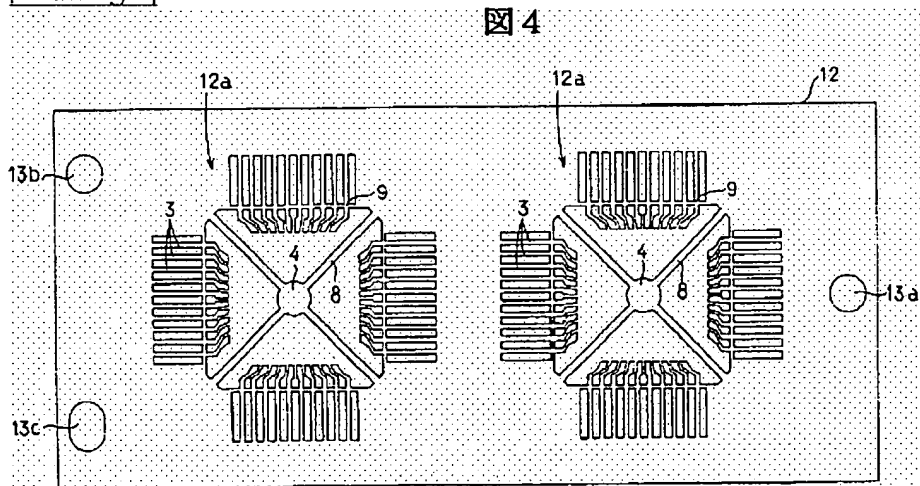
[Drawing 12]



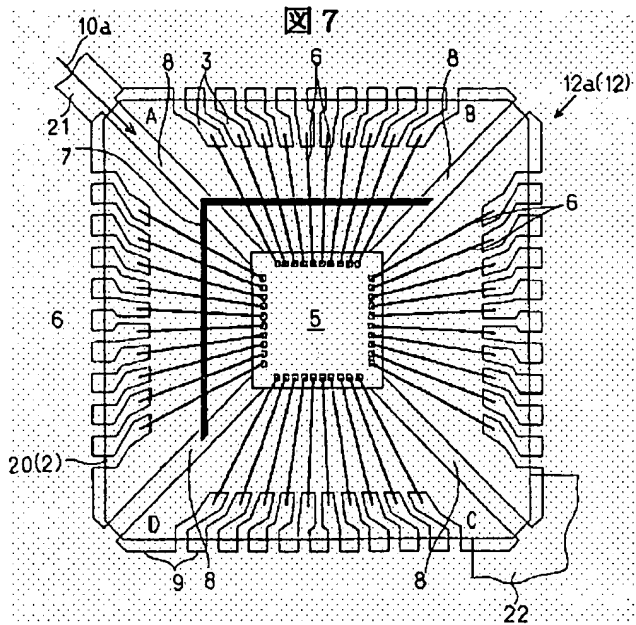
[Drawing 3]



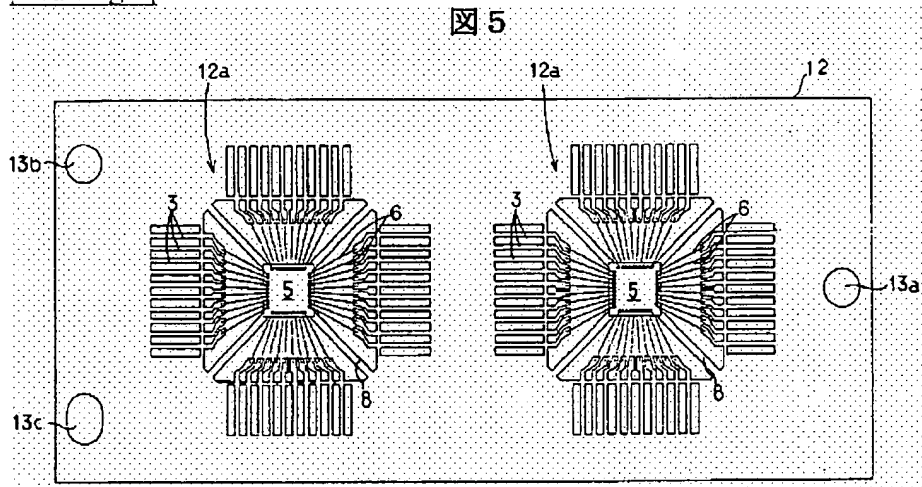
[Drawing 4]



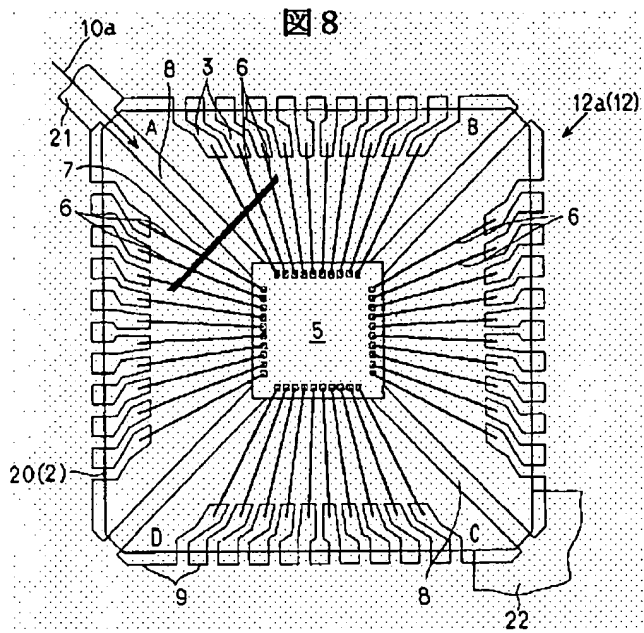
[Drawing 7]



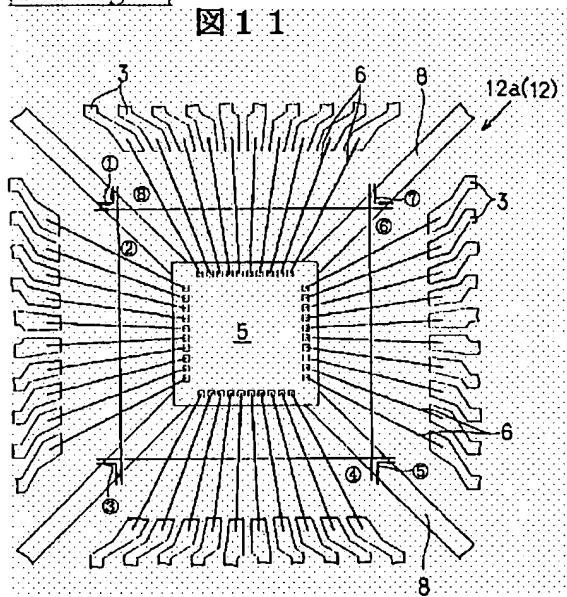
[Drawing 5]



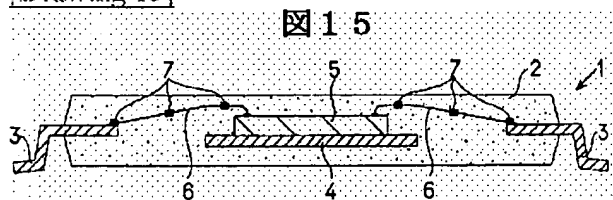
[Drawing 8]



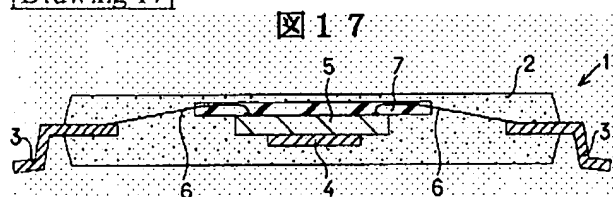
[Drawing 11]



[Drawing 15]

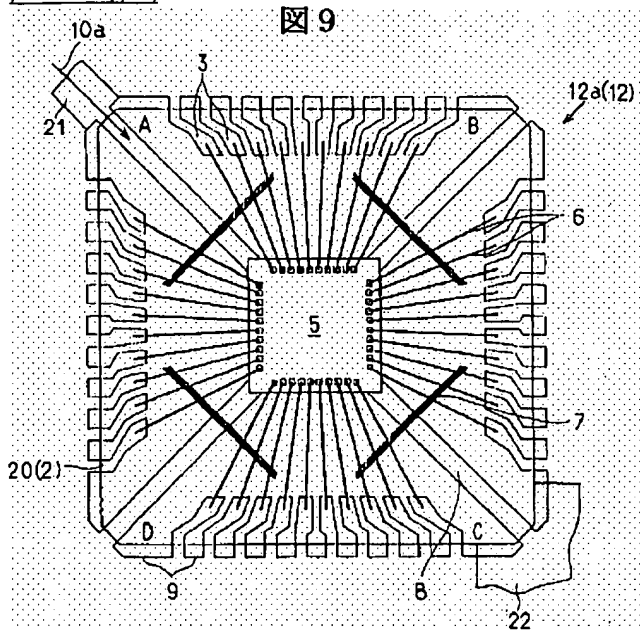


[Drawing 17]

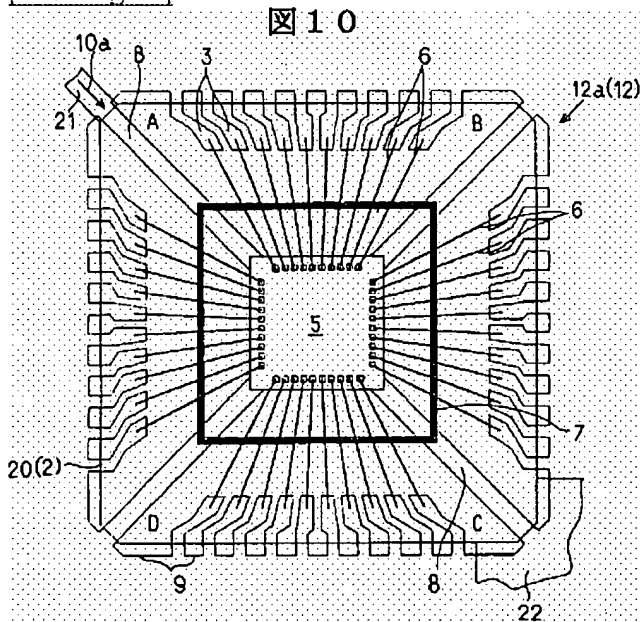




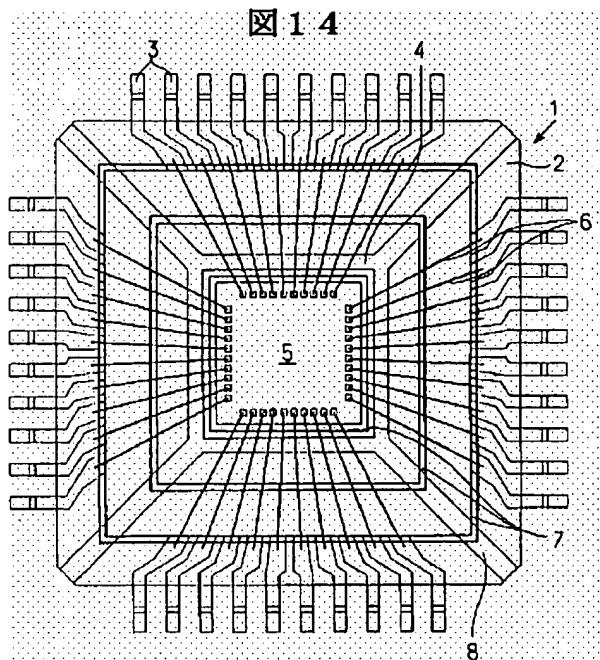
[Drawing 9]



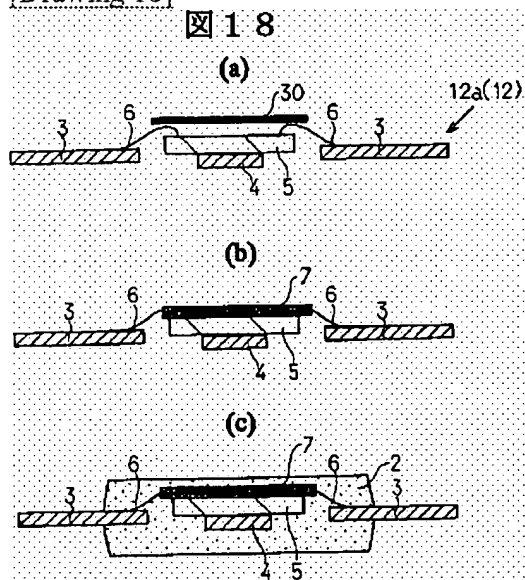
[Drawing 10]



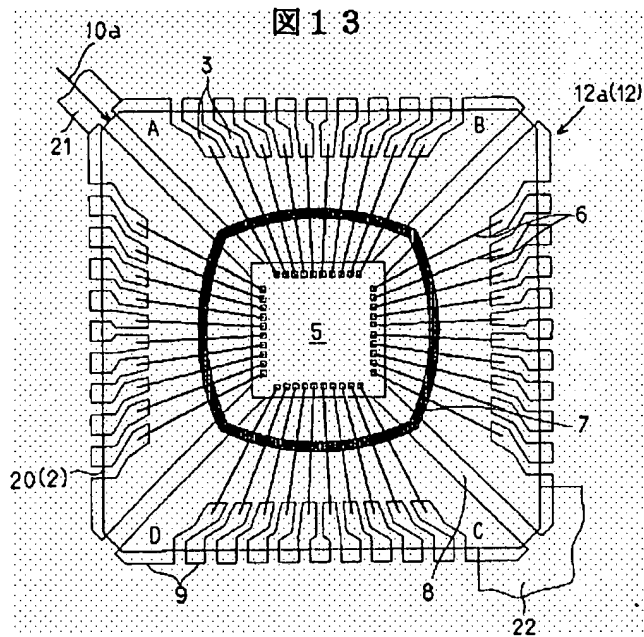
[Drawing 14]



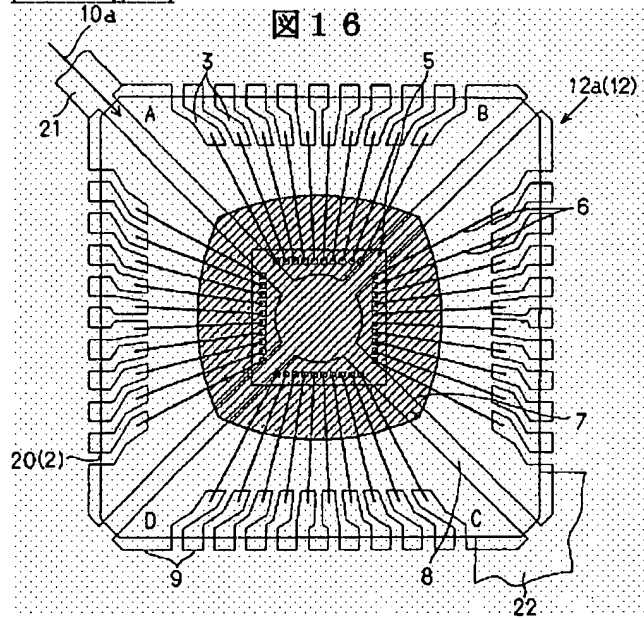
[Drawing 18]



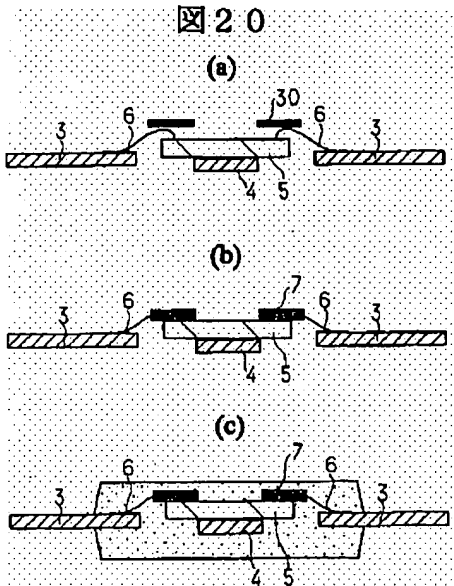
[Drawing 13]



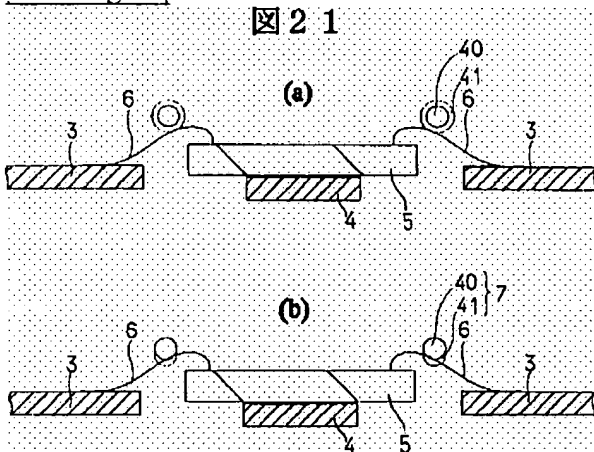
[Drawing 16]



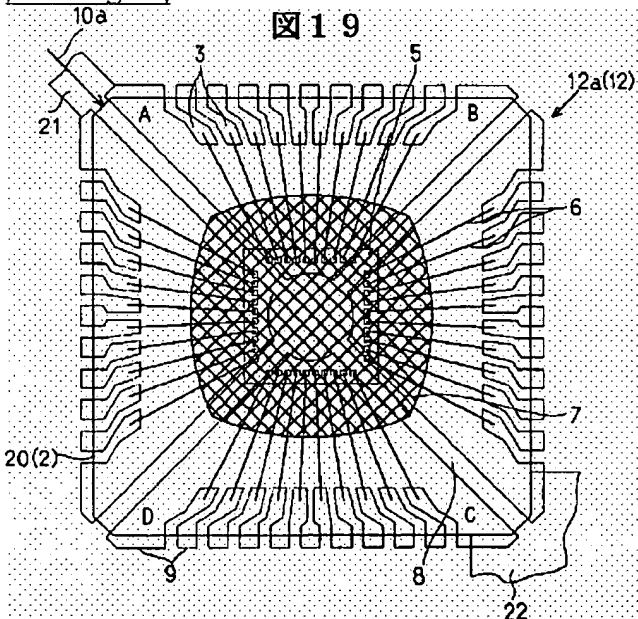
[Drawing 20]



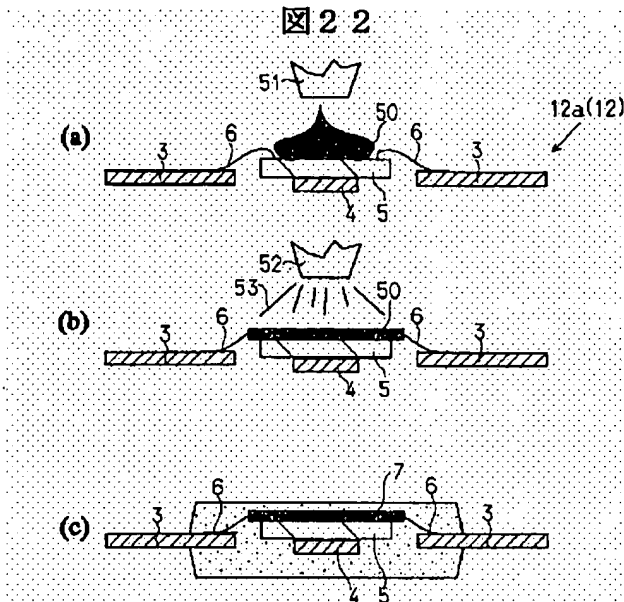
[Drawing 21]



[Drawing 19]



[Drawing 22]



[Translation done.]